

### HyperText Markup Language (HTML)

HTML is the language used by Web servers to create and connect documents that are viewed by Web clients. HTML uses Hypertext documents. Other uses of Hypertext documents are described in U.S. Pat. No. 5,204,947, granted Apr. 20, 1993 to Bernstein et al.; U.S. Pat. No. 5,297,249, granted Mar. 22, 1994 to Bernstein et al.; U.S. Pat. No. 5,355,472, granted Oct. 11, 1994 to Lewis; all of which are assigned to International Business Machines Corporation, and which are referenced herein.

### BACKGROUND OF THE INVENTION

The Internet is not a single network, it has no owner or controller, but is an unruly network of networks, a confederation of many different nets, public and private, big and small, that have agreed to connect to one another. An intranet is a network which is restricted and while it may follow the Internet protocol, none or only part of the network available from outside a "firewall" surrounding the intranet is part of the agreed connection to the Internet. The composite network represented by these networks relies on no single transmission medium, bi-directional communication can occur via satellite links, fiber-optic trunk lines, phone lines, cable TV wires and local radio links. When your client computer logs onto the Internet at a university, a corporate office or from home, everything looks local, but the access to the network does cost time and line charges. Until recently, "cruising or surfing" the Internet was a disorienting, even infuriating experience, something like trying to navigate without charts. The World Wide Web, a sub-network of the Internet, introduced about two years ago, made it easier by letting people jump from one server to another simply by selecting a highlighted word, picture or icon (a program object representation) about which they want more information—a maneuver known as a "hyperlink". In order to explore the WWW today, the user loads a special navigation program, called a "Web browser" onto his computer. While there are several versions of Web browsers, IBM's example is the new WebExplorer which offers users of IBM's OS/2 Warp system software a consistent, easy to use desktop of pictorial icons and pull down menus. As part of a group of integrated applications available from IBM for OS/2 Warp called the IBM Internet Connection, lets users log onto the Internet.

To this point the World Wide Web (Web) provided by Internet has been used in industry predominately as a means of communication, advertisement, and placement of orders. As background for our invention there now exists a number of Internet browsers. Common examples are NetScape, Mosaic and IBM's Web Explorer. Browsers allow a user of a client to access servers located throughout the world for information which is stored therein and provided to the client by the server by sending files or data packs to the requesting client from the served resources. An example of such a request might be something called GSQL (get SQL) which was a NCSA language and CGI server program developed to getting textual results for a client caller. Developed by Jason Ng at the University of Illinois, this document provided a way to map SQL forms against a database, and return the textual results to the client caller. This system is unlike the present invention, and presents difficulties which are overcome by our described system.

These servers act as a kind of Application Processing Agent, or (as they may be referred to) an "intelligent agent", by receiving a function request from a client in response to which the server which performs tasks, the function, based on received requests from a client in a distributed environ-

ment. This function shipping concept in a distributed environment was first illustrated by CICS as a result of the invention described in U.S. Pat. No. 4,274,139 to Hodgkinson et al. This kind of function, illustrated by CICS and its improvements, has been widely used in what is now known as transaction processing. However, servers today, while performing many functions, do not permit the functions which we have developed to be performed as we will describe.

Now, "surfing" the Internet with the WWW is still a time consuming affair, and the information received is not generally useful in the form presented. Even with 14,400 baud connection to the Internet much line time is tied up in just keeping going an access to the Internet, and the users don't generally know where to go. Furthermore the coupling of resources available on a company's intranet and those available on the Internet has not been resolved. There is a need to reduce gateways, make better use of existing equipment, and allow greater and more effective usage of information which is resident in many different databases on many different servers, not only within a homogeneous network but also via the Internet and heterogeneous network systems.

The problems with creating access to the world via the Internet and still to allow internal access to databases has been enormous. However, the need for a system which can be used across machines and operating systems and differing gateways is strongly felt by users of the Internet today. Anyone who has spent hours at a WWW browser doing simple task knows how difficult it still is to navigate thorough arcane rules without knowing where to go and even if you know what you are doing spending hours doing routine tasks. Many needs exist. As one important instance, until now we know of no way to access data on multiple databases of different types using a single user request from a client. This and other difficulties are solved by our invention.

### SUMMARY OF THE INVENTION

In accordance with our invention needless user intervention is eliminate or greatly reduced with a Web server supports an HTTPD which is provided with the capabilities of our control program agent which organizes sub-agents supporting command file objects or capsules to perform tasks in support of a Web browser's request for service as programmable functions receiving parameters as input and providing as their output handled by the control program agent task completed results for reporting in accordance with the Web browser request in the form and to the location determined by a request and handling these request without needless user intervention.

In accordance with our invention, we have created a way to allow Web users to request information that is created by a data interpretation system (DIS) and then presented by a web server to the user of the web. Our solution provides a way of requesting and processing and presenting information on the Web. In the process, data is retrieved from multiple sources which may be located remotely and accessed via an intranet routing and via the Web Internet and processed by our decision support capsules. Now companies and universities, and other users that want to access data located on different databases, want that data processed and formatted, and presented in a form the user desires, such as a graphical format. Our solution permits users to access information from various sources and obtain information at a desired location as a result of a single request which is responded to by an organization of facilities and command